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Study of catalyst effect on heavy crude oil oxidation process in enhancing oil recovery

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Abstract

© SGEM2018. Metal-based catalysts have shown promising applications and effects in different thermal enhanced oil recovery (THEOR) to improve oil recovery from oil reservoirs. Also, catalysts were chosen due to their exclusive properties, such as high surface area to volume ratio, high degree of dispersion in porous media and high catalytic activity. This study is aimed at developing a catalytic-enhanced oil recovery for heavy crude oil using in-situ combustion method in the presence of catalyst. In order to that, we synthesized significant core-shell particles (Al2O3@MnO2) to use in In-Situ Combustion method. Herein, we suspended dispersible catalyst in heavy crude oil. Differential Scanning Calorimetry (DSC) has been used for catalysts efficiency in low-temperature oxidation process study. In all, the present work holds great a first-hand route heavy crude oil oxidation system based on facial synthesis catalyst in the presence of air. For the purpose of accomplishing better performance or new application, studies on synergistic effects are suggested for investigation in future metal-based catalyts research. We revealed that in the presence of catalysts accelerate the oxidation process of heavy crude oil, DSC curves of heavy oil confirmed that using catalyst created significant exothermic peak and caused to shift to lower temperatures and overall this study has introduced new route and effective to heavy crude oil oxidation for thermal enhancing heavy oil recovery. This study is one of the first step in showing the feasibility of using metal-based catalysts in core-shell structure for crude oil oxidation in enhancing oil recovery.

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Keywords

Catalyst, Core-shell, Crude oil oxidation, In-Situ combustion

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